

**Amendments to the Drawings:**

**In the Drawings:**

Please ADD new sheet illustrating Fig. 11 to the application.

### REMARKS

Applicants previously presented claims 1 through 27 for examination. In the above-identified Office Action, the Examiner has withdrawn a prior election/restriction requirement, which Applicants acknowledge with gratitude; objected to the drawings; objected to the specification; and rejected all the claims.

Applicants appreciate the Examiner's detailed comments in her Office Action to the above-identified application. For the reasons to be stated below, however, Applicants respectfully traverse the rejections.

By this amendment, Applicants have cancelled claim 23; have amended claims 1-6, 9, 10, 12, 15 and 20-22 to further clarify the subject matter regarded as the invention; have added claim 28; and have submitted a proposed new drawing with corresponding changes in the specification. Accordingly, claims 1-22 and 24-28 remain pending. Applicants respectfully request that the Examiner reconsider the application in light of the amendments and the remarks expressed herein.

#### Drawing Objections

The Office Action objected to the drawings because the "computing unit" as recited in claims 22 and 25-27 allegedly was not shown. To expedite the prosecution, Applicants have added Figure 11 as support for the "computing unit". The support for Figure 11 can be found, for example, in claims 22 and 25-27. In view of the submission, Applicants respectfully request withdrawal of the objection.

#### Antecedent Basis Objections

Claims 9, 10 and 12 were objected to because of allegedly improper antecedent basis for the term "power level" and "average power level." To expedite the prosecution, Applicants have amended claims 9, 10 and 12 accordingly. In view of the amendment, Applicants respectfully request withdrawal of the objection.

### 112 Rejections

Claims 20 and 21 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action stated that the recitation "at an event" was not clear. Applicants respectfully disagree.

In a general sense, claim 20 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a microphone at an event. Claim 21 is on a hearing enhancement system that can access audio signals from another instrument, and the another instrument is related to a speaker at an event. The event can be, for example, a concert, a play or a presentation.

For example, paragraphs 88- 91 in the specification, partially reproduced below with emphasis added, can help explain the phrase "at an event":

In private, such as at home, hearing impaired people sometimes might have a tendency to increase the sound level of audio or video instruments a bit too high. On the other hand, in public, hearing impaired people sometimes might have difficulty hearing. In one embodiment, the system is further designed to pick up, capture or access audio signals from portable or non-portable instruments, with the interface unit serving as a personalized listening unit.

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FIG. 10 shows examples of such other portable or non-portable instruments. The instruments can be used in a private environment, such as at home, or attached to the user. This can include entertainment units, such as televisions, stereo systems, CD players, or radios....

Regarding public use, the user can be at a conference or a theater. The system can be coupled to the conference microphone or the theater speaker wirelessly, and thus be capable of capturing and enhancing the audio signals therefrom.

As stated above, the user goes to an event, such as going to a conference or to a theater. A hearing enhancement system according to an embodiment of the present invention can help the user hear at the event. The system can access audio signals from an instrument, which can be a microphone at the event. Alternatively, the system can access audio

signals from an instrument, which can be a speaker at the event. At least based on the above explanation, Applicants do not understand why the phrase "at an event" is unclear. Hence Applicants respectfully request withdrawal of the 112 rejection.

103 Rejections regarding claims 1-6, 11 and 13-26

Claims 1-6, 11 and 13-26 under 35 USC 103(a) as being unpatentable over Taenzer et al. (US 6,631,196, hereinafter referred to as "Taenzer") in view of Fretz (US 6,275,596). Applicants respectfully disagree.

Instead of audio signals, Taenzer delivers inaudible ultrasonic signals to a user's ear

Taenzer teaches a communication system that relies on transporting inaudible ultrasonic carrier directly into the ear canal of a user. Then the non-linearity within the ear itself demodulates the ultrasonic carrier, without producing audible sounds at the input to the user's ear.<sup>1</sup> In Taenzer, the "ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ...."<sup>2</sup> Since "audio acoustic energy is not produced in the air, audio acoustic sound is not radiated from the user's ear. As such, others in the vicinity of the user will hear no sound from the earpiece, thereby providing secure secret communication."<sup>3</sup>

The Office Action alleged that in Taenzer, "at least a portion of the ultrasonic signals is transformed into output audio signals in air," and cited col. 7, lines 24-28 as support. Applicants again respectfully disagree. That section of Taenzer is reproduced as follows, with emphasis added:

In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.

In the above section, Taenzer has not taught or suggested ultrasonic signals being transformed into output audio signals in air. That section seems to teach just the

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<sup>1</sup> See Taenzer's Abstract.

<sup>2</sup> Col. 5, lines 1-3 in Taenzer.

<sup>3</sup> Col. 5, lines 29-31 in Taenzer.

opposite—the human ear receives the audio signal as inaudible airborne ultrasonic energy.

Taenzer intends not to create any audio sound outside the user's ear. Taenzer has re-emphasized this objective at numerous places of its patent. For example,

- Exemplary embodiments rely on the airborne transport of an inaudible ultrasonic carrier directly into the hearing mechanism of a user ....<sup>4</sup>
- The ultrasound-to-audio-sound conversion in the middle and/or inner ear does not require creation of audible sonic pressure waves in the air ....<sup>5</sup>
- [A]udio acoustic energy is not produced in the air ....<sup>6</sup>
- In either case, the mounting means is configured to mount an output of the ultrasonic transducer in proximity to a human ear canal at a location where a hearing mechanism associated with the human ear canal receives the audio signal as inaudible airborne ultrasonic energy.<sup>7</sup>
- The transducers 506 and 510, along with any other desired components, can be mounted in a mounting means, such as an earpiece, such that outputs from the transducers are in proximity to a human ear at a location where the hearing mechanism of the human ear receives the signal as inaudible airborne ultrasonic acoustic energy.<sup>8</sup>
- Because the communication device outputs inaudible pressure waves, there is no or very little audio frequency vibration of the tympanic membrane.... As such, there is no radiation of audible sound pressure waves from the ear, even when the device is used in an open canal or partially open canal configuration.<sup>9</sup>
- Use of this invention for providing the “sound” delivery portion of the system solves the feedback problem with no drawbacks, because the microphone is only sensitive to audio frequency sonic signals, while the inventive sound delivery system only delivers inaudible ultrasonic signals to the ear.<sup>10</sup>

<sup>4</sup> Col. 4, lines 59-61 in Taenzer.

<sup>5</sup> Col. 5, lines 1-3 in Taenzer.

<sup>6</sup> Col. 5, lines 29-30 in Taenzer, with emphasis added.

<sup>7</sup> Col. 7, lines 24-28 in Taenzer, with emphasis added.

<sup>8</sup> Col. 12, lines 8-13 in Taenzer, with emphasis added.

<sup>9</sup> Col. 12, lines 41-48 in Taenzer, with emphasis added.

<sup>10</sup> Col. 13, lines 2-7 in Taenzer, with emphasis added.

This is in distinct contrast to Applicants' claimed invention. For example, Applicants' independent claims 1 and 22 include the following limitations:

the directional speaker is configured to be spaced apart from at least one of the ears of the user so that at least a portion of the ultrasonic signals is transformed into output audio signals outside the at least one of the ears of the user, to be received by the at least one of the ears of the user

Thus, not only has Taenzer not taught or suggested Applicants' claimed invention, Taenzer teaches away from Applicants' claimed invention.

Combining Taenzer and Fretz would destroy the intended function of Taenzer

Taenzer does not teach that a portion of the output audio signals is configured to have higher power than another portion to enhance the hearing of the user. To try to remedy the deficiencies, the Office Action introduced Fretz.

Fretz pertains to an open ear canal hearing aid system so that the ear canal is at least partially open for directly receiving ambient sounds.<sup>11</sup> Fretz specifically teaches that its hearing aid system generates "audible sounds and delivers these sounds to the hearing aid tube 30".<sup>12</sup> In other words, audible sounds are delivered to the ear of the user. This is distinctly different and again teaches away from Taenzer, which only delivers inaudible sound to the ear.

References cannot be combined if their intended function is destroyed. To combine Fretz with Taenzer would destroy the intended function of Taenzer. Thus it is inappropriate to combine Fretz with Taenzer.

In addition, Fretz also cannot overcome the deficiencies Applicants noted above regarding Taenzer.

Based on the foregoing, it is submitted that claims 1 and 22 are patentably distinct from Taenzer and Fretz, singly or in combination. In addition, it is submitted that dependent claims 2-6, 11, 13-21, and 23-26 are also patentably distinct for at least the same reasons. Additional reasons regarding a number of dependent claims being patentable over Taenzer and Fretz are discussed below.

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<sup>11</sup> See Fretz's Abstract.

<sup>12</sup> Col. 6, lines 39-41 of Fretz.

**Claim 6: Power can be changed as a function of frequency**

The Office Action rejected claim 6 arguing that the identification of frequencies to be amplified for a specific wearer is inherently determined through calibration. Applicants respectfully disagree.

To further clarify the limitations, Applicants have amended claim 6 to include the limitations of the hearing enhancement system being configured to allow the power of the output audio signals to be changed as a function of frequency, such that the user of the system can change the power in view of the calibration results. Fretz does not teach or suggest hearing calibration, let alone allowing the power to be changed as a function of frequency. Thus, it is submitted again that claim 6 is patentably distinct from Taenzer and Fretz, singly or in combination.

**Claim 15: Direction of the output audio signals can be changed**

The Office Action rejected claim 15 arguing that Taenzer teaches "more than one directional speaker" in its Figure 5. Applicants respectfully disagree. The two speakers in Taenzer's Figure 5 generate two ultrasonic frequencies. The difference between the two frequencies becomes the audio signal.

There is no teaching or suggestion in Taenzer where the phases of the ultrasonic signals driving at least two directional speakers differ by a preset value, and the direction of the output audio signals can be changed by changing the preset value. Thus, it is submitted again that claim 15 is patentably distinct from Taenzer and Fretz, singly or in combination.

**Claims 20 and 21: The another instrument is related to a microphone or a speaker at an event.**

The Office Action just asserted conclusively, with no support, that Taenzer appears to teach that its system can access audio signals from another instrument, and the another instrument is related to a microphone or a speaker at an event. Applicants respectfully disagree. There is no such teaching or suggestion in Taenzer. Rejections on obviousness grounds cannot be sustained by mere conclusory statements. Instead there must be some articulated reasoning with some rational underpinning to support the legal

conclusion of obviousness. Applicants again respectfully request withdrawing the 103 rejections on claims 20 and 21.

Claim 24: the speaker is attachable to the clothing worn by the user

The Office Action rejected claim 24, relying on col. 7, lines 13-18, and inappropriately arguing that Taenzer's speaker can be in any other convenient location near a user's ear. Applicants respectfully disagree.

In col. 7, lines 13-18, Taenzer explained that its earpiece 112 can be "in any other convenient location near or in a user's ear." However, that section of Taenzer specifically defines its earpiece 112 by stating that "A means for mounting the transducer or transducers is represented as an earpiece 112...." In other words, the earpiece 112 in Taenzer is its means for mounting Taenzer's transducer. The earpiece 112 is not Taenzer's speaker.

As explained above, Taenzer's speaker delivers inaudible ultrasonic signals to the ear, with no audio acoustic energy produced in air. Thus, it is not clear how Taenzer's speaker can be attached to the clothing worn by the user. Thus, it is submitted again that claim 24 is patentably distinct from Taenzer and Fretz, singly or in combination.

Claim 26: Computing unit separate from directional speaker

The Office Action rejected claim 26, alleging that Taenzer in its column 8, lines 43-48, reads on the limitation of Applicants' computing unit that is separate from the directional speaker but operatively coupling with the speaker over a wireless link. Applicants respectfully disagree.

In the section cited by the Office Action, Taenzer teaches a communication device 100 including a microphone 116 to pick up the user's voice, for transmission to a remote location via a wired link or a wireless link (connected to a sound processing unit). Though not clear what Taenzer's sound processing unit does, Applicants submit that the sound processing unit is different from Applicants' claimed computing unit.

Applicants in claim 26 states that the computing unit is configured so that at least certain frequencies of the output audio signals are being modified differently than other



frequencies to enhance the hearing of the user. Note that at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation.

In Taenzer, though it is not clear what its sound processing unit does, the sound processing unit is not configured so that at least certain frequencies of the output audio signals are being modified differently than other frequencies to enhance the hearing of the user, particularly when at least a portion of the input audio signals becomes the output audio signals via an ultrasonic transformation. Thus, it is submitted again that claim 26 is patentably distinct from Taenzer and Fretz, singly or in combination.

103 Rejections regarding claims 7-10, 12 and 27

The Office Action has also rejected claim 8 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Slavin (US 4,622,440); claims 7, 9, 10 and 27 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Marx (US 4,955,729); and claim 12 under 35 USC 103(a) as being unpatentable over Taenzer in view of Fretz and further in view of Charpentier (US 5,321,758). Applicants respectfully disagree.

Initially, Applicants disagree with the reasons to combine Slavin, Marx and Charpentier with Taenzer and Fretz in the manner that the Office Action proposes. Furthermore, Slavin, Marx and Charpentier do not overcome the deficiencies of Taenzer and Fretz noted above; with Taenzer and Fretz, singly or in combination, not teaching or suggesting any of the independent claims, bringing in Slavin, Marx and Charpentier for additional features in dependent claims would not remedy the deficiencies in Taenzer and Fretz regarding the independent claims. Based on the foregoing, it is submitted that claims 7-10, 12 and 27 are patentably distinct from Taenzer, Fretz, Slavin, Marx and/or Charpentier, singly or in any combination.

The independent or the dependent claims recite additional elements which when taken in the context of the claimed invention further patentably distinguish the art of record. The additional limitations recited in the independent claims or the dependent claims are not further discussed as the above-discussed limitations are clearly sufficient to distinguish the claimed invention from Taenzer, Fretz, Slavin, Marx and/or

Charpentier. Thus, it is respectfully requested that the Examiner withdraw the rejection of claims 1-22 and 24-27 under 35 USC §103(a).

Regarding the remaining references cited by the Examiner, since they have not been applied against any of the claims and do not appear properly applicable thereto, no further mention thereof will be made.


In the event that the Examiner, upon reconsideration, determines that an action other than an allowance is appropriate, the Examiner is requested and authorized to telephone Applicants' representative below prior to taking such action, if the Examiner feels that such a telephone call will advance the prosecution of the present application.

If there are any issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned representative at the telephone number listed below.

Any required fee in connection with the filing of this response is to be charged to Deposit Account No. 50-0388.

Respectfully submitted,

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